subject of intra-thoracic new growths, which he handles in a most satisfactory manner. The articles on thrombosis and embolism are from the pen of Prof. Welch, and are treated very fully. A most copious bibliography is appended, amounting to six pages.

An interesting illustration of the essential unity of the nerve muscle machine is afforded by a study of the editor's attempt to consider in two separate sections diseases of the muscles and diseases of the nervous system. How far one can divide, from the standpoint of disease, the neuro from the muscular element is naturally of interest. As a matter of fact, however, it is to be noted that, whereas the division between these two classes of diseases in the general page of contents takes place between the articles upon facial hemiatrophy and general pathology of the nervous system, in the text this is not so, the division occurring between the articles upon erythromelalgia and diseases of the nerves. This may be due, of course, to accident; at any rate, it should be cleared up.

In the section devoted to diseases of the muscles, Prof. Sherrington contributes a most interesting article upon tremor, tendon-phenomenon and spasm, and Dr. Bevan Lewis one on the general pathology of the nervous system.

Space equivalent to two whole volumes or rather more is devoted to diseases of the nervous system, and the various articles upon the different subjects in this section are very complete. A few monographs are to be found here and there, in appropriate places, upon the general physiology and pathology of the subject. Noteworthy amongst these is Dr. Ferrier's essay upon the regional diagnosis of cerebral disease. In it the chief parts of the brain are considered seriatim, the effect of lesions of them described, some clinical cases given, and a bibliography appended to each section. This latter method will greatly facilitate reference, and might with advantage have been adopted in other instances. Dr. Bastian contributes an able essay upon aphasia and other speech defects. Hysteria forms a subject of an interesting monograph by Dr. Ormerod. The author discusses at some length the hypotheses of hysteria, and criticises the psychical speculations of Janet. Neurasthenia is treated of at length by the editor. He defends the entity of the disease, describing different forms of it according to the organ or set of organs presenting functional aberration. Prof. Victor Horsley writes upon traumatic neurasthenia. Under this term cases of nervous disturbance after railway accidents and other agencies producing sudden fear or emotion, &c., are considered. The article should prove useful to the medical advisers of railway companies; it concludes with a suggestive paragraph upon malingering and points of medical jurisprudence.

A section, occupying some four hundred pages, is devoted to mental diseases. In the editing of this section Prof. Allbutt has been assisted by Dr. Savage. Dr. Mercier contributes a philosophical article upon vice, crime and insanity. The volume concludes with a series of essays upon diseases of the skin. A short appendix, comprising an account of the recent researches on the malarial parasite, has been wisely added to supplement Prof. Osler's article on malaria in vol. ii.

The editor and his collaborators must be immensely relieved that so prolonged an effort has finally terminated. The fact that the system is somewhat more bulky than was originally intended can scarcely be considered a disadvantage. Portability is hardly expected of a "system"; further, Prof. Allbutt's work, taking in regard the voluminous increase which has occurred in medical literature in the interim, compares favourably, in so far as bulk is concerned, with its predecessor. It is sincerely to be hoped, and indeed expected, that the book will meet at the hands of the profession with that success which it richly deserves.

F. W. TUNNICLIFFE.

THE NATURAL HISTORY OF WHALES.

A Book on Whales. By F. E. Beddard, M.A., F.R.S. With 40 illustrations by W. Sidney Berridge. Pp. xv + 320. (London: John Murray, 1900.)

THE editor of the "Progressive Science Series," Mr. Beddard, has undertaken the preparation of the volume "On Whales." Amongst the mammalia, no order is more remarkable than the Cetacea. The huge size, both in length and bulk, attained by many of the species, their fish-like habitat, the modifications in mammalian structure necessary to adapt them for a life in the water, and the difficulties attendant on their capture, have invested them with an interest which appeals to the popular imagination as well as to the naturalist. In writing this book, Mr. Beddard has had in view the compilation of a volume which, whilst based on scientific lines, should be expressed in language divested as far as possible of technicalities, so that the descriptions might be understood by educated persons generally. In this respect he has succeeded.

In the earlier chapters he describes the most characteristic features in the external form and in the internal structure of whales, and he compares them with other aquatic mammals. In their size, such species as *Balaenoptera musculus* and *B. sibbaldii* are not only the largest of living mammals, but there is no evidence of animals having in past times existed which possessed a greater magnitude, the most gigantic extinct Saurian reptile, or even the Iguanodon, dwindling into insignificance beside these monsters of the deep. The skeleton in the largest species, more especially the skull and spine, is characterised by the bulk of the bones. There seems to be a relation in the thickness of the tegumentary blubber and the quantity of its contained oil to the weight of the bones. In the Greenland Whale the individual bones are much heavier in relation to their size than in the Balænopteridæ, and the blubber is so much thicker in the former, that a *Balaena mysticetus*, without taking into account the much greater value of its whalebone, and estimating only that of its oil, repays the whaling seaman much more than the capture of Sibbald's Whale, although the latter may be from 20 to 30 feet longer. In the Sperm Whale, again, in addition to the valuable oil in the blubber, the cavity in its huge head contains many gallons of the peculiar fat, which, when solidified after the death of the animal, forms the well-known commercial article called spermaceti. The fat with which these animals are so abundantly provided, being of much less specific gravity than the

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medium in which they live, enables them, with comparatively little muscular exertion, to float on and near the surface of the water, and to breathe directly the air which is required in mammalian respiration. A feature in Cetacean anatomy is the great capacity of the thorax, the consequent large size and expansibility of the lungs, and the mobility of the ribs, which in the whalebone whales only articulate with the sternum by a single pair. The external configuration of the chest varies in different species; in *B. mysticetus* it is rounded laterally and somewhat barrel-shaped; but in the Finners it is more elongated in the dorsi-ventral diameter, and with a smaller diameter from side to side. In both forms it is capable of great expansion, so that the whale can dive to a great depth and remain under water for a considerable time, until the need arises to come to the surface to expire the contaminated air in the act of "blowing," and to take in a fresh supply.

In the chapters on classification, Mr. Beddard has very properly rejected many of the generic names introduced by the late Dr. E. Gray, who in his later life gave to each species a new generic name, and almost went so far as to regard each skeleton, or part of a skeleton, in the British Museum as representing a distinct species. He has adopted the more restricted nomenclature employed by van Beneden, Flower, Turner, and other recent cetological authorities. His descriptions of the specific characters are tersely put, and can be readily understood even by those who are not trained anatomists. The figures of the species, so far as he has provided illustrations, are characteristic, though in at least five instances his drawings have been made from the series of casts displayed in the Whale-room in the British Museum, the last administrative work discharged by Sir W. H. Flower, and not from the original drawings. We observe, however, that several of our British species are not figured; three species of Balænoptera, the Humpbacked Whale, the White Whale, *Lagenorhynchus albirostris*, and even the common Porpoise, except in its embryonic form, have not been included in the illustrations. This is much to be regretted, as one of the main objects of a semi-popular book of this kind should be to place in the hands of those who live at the seaside a work which will enable them to discriminate the species of whales, examples of which from time to time are stranded on our shores, and not to class them all together, as is too often done, as "bottle noses." How important it is to familiarise people who have some taste for natural history studies, with the means of recognising specific differences, is illustrated by Sowerby's Whale. The first example of this Cetacean was described by James Sowerby from a specimen stranded in 1800 on the shores of the Moray Firth. No further specimen was recognised in Scotland until 1872, since which date two specimens have been obtained in the Shetland Isles, two in the Firth of Forth, and in September of last year Mr. William Taylor secured three specimens—male, female and young—stranded in the Moray Firth only a few miles from the spot where Sowerby's original example was found. On the English coast a specimen was got in 1885 at Spurnpoint, and another in 1892 at Overstrand, near Cromer; but we know of only one specimen identified on the coast of Ireland. It is obvious, therefore, that this Cetacean is not so uncommon as was originally supposed. When those who dwell by the sea become more alive to the recognition of the specific characters of whales, we may reasonably hope that other species, now considered rare, may be found to be not infrequent visitors to our shores.

RESEARCHES ON GLYCOGEN.

Microscopic Researches on Glycogen. Part ii. Glycogen of Snails and Slugs, in morphological and physiological correspondence with the Lymph System of Vertebrates. By Charles Creighton, M.D. Pp. 127; 9 coloured plates. (London: Adam and Charles Black, 1899.)

PART I. of this work, which appeared about three years ago, treated of the physiological functions of glycogen. It contained a number of interesting records of microscopic work, and showed that glycogen is present in a number of situations, particularly during embryonic life, in which its presence was previously unsuspected. Claude Bernard, in his classical work on the subject, recognised the presence of glycogen in the placenta and many other embryonic structures, and Dr. Creighton amplified this by more numerous observations. As development progresses, and specialisation of function occurs, the glycogenic function is narrowed down to the liver and muscles instead of being widespread throughout the tissues. Dr. Creighton concluded, on what we regard as insufficient grounds, that the function of glycogen is much more important than physiologists have hitherto considered to be the case. He insists on its "formative" function, by which we suppose he means that it is an all-important or even essential substance in the construction of living matter, and he even assigns to it a respiratory function, believing that in early life it takes the place of hæmoglobin. His proofs of its oxygen-carrying capacity were even less complete than those of its formative properties.

All physiologists admit the importance of glycogen; they would require very stringent evidence, however, before they admitted that it is essential to the formation of protoplasm, or that a carbohydrate is capable of doing the work of a complex nitrogenous and iron-containing material like hæmoglobin. It is regarded rather as a storage or reserve product, part of the cell-contents rather than part of the cell-substance, and its use is doubtless principally by its subsequent combustion to contribute to the liberation of energy in the form of molar and molecular movement, work and heat.

In Part ii., which is now before us, we have as before a very elaborate series of microscopic observations, undertaken with infinite pains, and illustrated by excellent drawings. It treats of the various invertebrate classes, and shows the presence of glycogen in numerous situations; the work of others in the same connection has been collected with care. The proof that the substance is always glycogen would have been more complete if the observer had not limited himself to one test, namely, the micro-chemical reaction with iodine. Still, if we regard this as trustworthy, we have before us a valuable collection of observations which show how

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